

### **REMARKS**

Claims 1-7 were examined and reported in the Office Action. Claims 1-7 are rejected. Claim 1 is amended. New claim 8 is added. Claims 1-8 remain.

Applicant requests reconsideration of the application in view of the following remarks.

**I. 35 U.S.C. § 112, first paragraph**

It is asserted in the Office Action that claims 1-7 are rejected in the Office Action under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. Applicant has amended claim 1 to overcome the 35 U.S.C. § 112, first paragraph rejection.

Accordingly, withdrawal of the 35 U.S.C. § 112, first paragraph rejections for claims 1-7 is respectfully requested.

**II. 35 U.S.C. § 103(a)**

**A.** It is asserted in the Office Action that claims 1-7 are rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over U. S. Patent No. 4,996,573 issued to Hack et al. ("Hack") taken with U. S. Patent No. 6,215,130 issued to Dodabalpur ("Dodabalpur"). Applicant traverses the aforementioned rejection for the following reasons.

According to MPEP §2142

[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of

success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (*In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). *"All words in a claim must be considered in judging the patentability of that claim against the prior art."* (*In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant's claim 1 contains the limitation of

[a] vertical structure thin film transistor comprising a stacked structure of a substrate; a first electrode; a dielectric thin film; a second electrode including a metal element divided into a plurality of electrode portions, each electrode portion including a metal element; a semiconductor thin film; and a third electrode, wherein current directly flows from the second electrode to the third electrode perpendicularly to the substrate and is modulated by an electric field generated from the first electrode parallel to the current, and the dielectric thin film.

Hack discloses a thin film transistor having electrode fingers 16 that include metal stripe 20, semiconductor stripes 18 and barrier side walls 22. (Hack, Figs. 1 and 3). A Schottky barrier between metal stripes 20 and a semiconductor charge transport layer prevents current from flowing directly between the metal stripes 20 and a drain electrode 26. (Hack, column 4, lines 23-27). That is, Hack discloses that current cannot directly flow from the second electrode to the third electrode. This teaches away from Applicant's claimed invention. Further, referring to Fig. 1 of Hack, when the gate electrode potential is switched to the ON state, current flows through the channel portion 30. Namely, current flows initially in a lateral direction, and then vertically to the drain electrode 26. Therefore, current flow direction does not completely coincide

with the direction of the electric field (column 4, lines 28-37). Thus, total current intensity is limited.

On the contrary, in Applicant's claimed invention, current flows directly from the second electrode to the third electrode and total current flow direction is parallel to the electric field. Moreover, the second electrode is divided into several electrode portions, which are separated from each other, so that the electric field generated from the first electrode can induce a current.

Further, Applicant's claimed invention includes a second electrode that includes a metal element and is divided into a plurality of electrode portions, and is not combined with semiconductor material stripes and side walls. And, in Applicant's claimed invention "current directly flows from the second electrode to the third electrode perpendicularly to the substrate and is modulated by an electric field generated from the first electrode parallel to the current."

Dodabalapur is relied on for teaching that electrodes can be made of metal. However, if Dodabalapur were combined with Hack, the resulting invention would still teach that current cannot flow directly from the second electrode to the third electrode because of the Schottky barrier in Hack. And, the design of Hack would be completely changed, resulting in disruption of the designed current flow. Therefore, it would not make sense to combine the features of Dodabalapur with those of Hack as doing so would destroy the goal and operation of Hack's invention.

Regarding the assertion in the Office Action that Hack discloses similar current flow and how the electric field acts on the semiconductor thin film, Applicant notes that Hack clearly teaches that "current is prevented from flowing directly between the metal stripes and the drain electrode 26." (Hack, column 4, lines 23-27, emphasis added). Further, Hack discloses current "initially flows laterally from the stripes 18 through the channel portions 30 of the sidewall barrier elements 22, and then vertically

through the semiconductor charge transport layer 24 to the drain electrode 26." (Hack, column 4, lines 33-37, emphasis added). Therefore, Hack does not teach, disclose or suggest "current directly flows from the second electrode to the third electrode perpendicularly to the substrate and is modulated by an electric field generated from the first electrode parallel to the current, and the dielectric thin film."

Moreover, according to MPEP 2142,

[t]o reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention 'as a whole' would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the 'differences,' conduct the search and evaluate the 'subject matter as a whole' of the invention. The tendency to resort to 'hindsight' based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." Applicant submits that without first reviewing Applicant's disclosure, no thought, whatsoever, would have been made to a structure where "a second electrode only made of metal and divided into a plurality of electrode portions, each electrode portion only made of metal; a semiconductor thin film; and a third electrode, wherein current directly flows from the second electrode to the third electrode perpendicularly to the substrate and is modulated by an electric field generated from the first electrode parallel to the current.

Therefore, even if Hack is combined with Dodabalapur, the resulting invention would still not teach, disclose or suggest all the limitations contained in Applicant's claim 1, as listed above. Since neither Hack, Dodabalapur, and therefore, nor the

combination of the two teach, disclose or suggest all the limitations of Applicant's claim 1, Applicant's claim 1 is not obvious over Hack in view of Dodabalapur since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from claim 1, namely claims 2-7, would also not be obvious over Hack in view of Dodabalapur for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 1-7 is respectfully requested.

**B.** It is asserted in the Office Action that claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hack, and further in view of Dodabalapur, and further in view of U. S. Patent No. 5,817,550 issued to Carey et al ("Carey").

Applicant's claim 4 directly depends on claim 1. Applicant has addressed Hack in view of Dodabalapur regarding claim 1 above in section II(A).

Carey is relied on solely for alternate substrate materials of "silicon or plastic." (Office Action, page 6). Like Hack and Dodabalapur, Carey does not teach, disclose or suggest

a second electrode including a metal element divided into a plurality of electrode portions, each electrode portion including a metal element; a semiconductor thin film; and a third electrode, wherein current directly flows from the second electrode to the third electrode perpendicularly to the substrate and is modulated by an electric field generated from the first electrode parallel to the current, and the dielectric thin film.

Therefore, even if Hack and Dodabalapur are combined with Carey, the resulting invention would still not teach, disclose or suggest all the limitations contained in Applicant's claim 1, as listed above. Since neither Hack, Dodabalapur, Carey, nor the combination of the three teach, disclose or suggest all the limitations of Applicant's

claim 1, Applicant's claim 1 is not obvious over Hack in view of Dodabalapur and in further view of Carey since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from claim 1, namely claim 4, would also not be obvious over Hack in view of Dodabalapur and further in view of Carey for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection for claim 4 is respectfully requested.

**CONCLUSION**

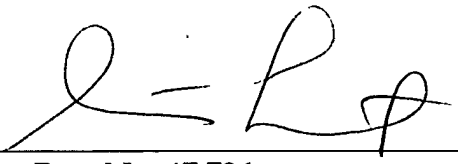
In view of the foregoing, it is submitted that claims 1-8 patentably define the subject invention over the cited references of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes a telephone conference would be useful in moving the case forward, he is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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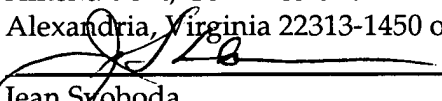
Dated: January 23, 2006

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